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IS 14889 (2000): Copper Tamping Powder for Carbon Brushes
[ETD 15: Rotating Machinery]

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Indian Standard

COPPER TAMPING POWDER FOR CARBON BRUSHES — SPECIFICATION

ICS 28.160.10

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

December 2000

Price Group 1

Rotating Machinery Sectional Committee, ET 15

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Rotating Machinery Sectional Committee had been approved by the Electrotechnical Division Council.

This standard has been brought out to standardize the requirements of tamping powder used for carbon brushes.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

COPPER TAMPING POWDER FOR CARBON BRUSHES — SPECIFICATION

1 SCOPE

This standard specifies the requirements of copper powder used for tamping of flexibles of carbon brushes.

2 REFERENCES

The following Indian Standards contain provisions which through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
1068 : 1993	Electroplated coatings of nickel plus chromium and copper plus nickel plus chromium (*third revision*)
1885 (Part 35) : 1993	Electrotechnical vocabulary: Part 35 Rotating machinery (*first revision*)
4840 : 1984	Method for determination of flow rate of metal powders for powder metallurgical purposes (*first revision*)
4848 : 1981	Method for determination of apparent density of free flowing powders for powder metallurgical purposes (*first revision*)
5461 : 1984	Method for sieve analysis of metal powders (*first revision*)
13466 : 1992	Brushes for electrical machines
13586 : 1993	Definitions and nomenclature for carbon brushes, brush-holders, commutators and slip-rings for electrical machinery

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 1885 (Part 35), IS 13586 and IS 13466 shall apply.

4 GRADES

This standard covers two types of grades, namely, Grade A and Grade B. Grade A is for general purpose application and Grade B is for specific application where higher brush flexible (pig tail) pull out strength and low millivolt drops are required.

5 MATERIAL

The material used for the tamping powder shall be of high purity electrical grade copper powder. The powder shall be manufactured by electrolytic process.

6 MARKING

6.1 The following information shall be marked on the packet/container of the product:

a) Grade;
b) Batch number;
c) Date of manufacture;
d) Date of expiry, etc, if any;
e) Quantity; and
f) Reference to this standard.

6.2 The powder shall be packed in an aluminium foil air-tight packet of 1/2 kg which shall be further packed in polythene bag.

6.3 BIS Certification Marking

The packet containing tamping powder may also be marked with the Standard Mark.

6.3.1 The use of Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which a licence for the use of the Standard Mark is granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

7 TESTS

7.1 The following tests are applicable for copper tamping powder:

a) Apparent density (**8.1**),
b) Flow rate (**8.2**),
c) Resistivity (**8.3**), and
d) Particle size distribution (**8.4**)

7.2 The tamping powder of various grades shall meet the requirements given in Tables 1 and 2.

7.3 Carbon brushes fabricated with the tamping powder shall meet the requirements of millivolt drop and flexible (pig tail) pull out strength in accordance with IS 13466.

Table 1 Sieve Analysis of Powders, Grade A

(*Clause* 7.2)

Particle Size Distribution Parameter	Requirements
(1)	(2)
+40 mesh	Nil
+60 mesh	20-50 percent
+80 mesh	35-70 percent
+200 mesh	< 25 percent
–200 mesh	< 2 percent
Apparent density	2.40 to 3.20 g/cm^3
Flow rate for 50 g	< 36 s
Resistivity	18 ± 4 micro-ohm-cm

Table 2 Sieve Analysis of Powders, Grade B

(*Clause* 7.2)

Particle Size Distribution Parameter	Requirements
(1)	(2)
+40 mesh	Nil
+60 mesh	< 1 percent
+80 mesh	< 3 percent
+100 mesh	35-55 percent
+200 mesh	40-60 percent
–200 mesh	< 8 percent
Apparent density	2.10 to 2.70 g/cm^3
Flow rate	< 33 s
Resistivity	—

7.4 It is recommended that microscopic examination may be carried out in accordance with **8.5**.

7.5 It is recommended that the tamping powder should be of such a quality that on hammering, the grannules break and flatten out to join with each other to form a chip. For method of verification of chip formation, **8.6** may be referred.

8 METHODS OF TESTS

8.1 Apparent Density Test

Test method as given in IS 4848 shall be followed.

8.2 Flow Rate

Test methods as given in IS 4840 shall be followed.

8.3 Resistivity

8.3.1 Resistivity is measured as resistance across compacted piece made from tamping powder.

8.3.2 *Method*

A compacting press is used for making the standard sample of size 10 mm × 10 mm × 64 mm or 4 mm × 8 mm × 32 mm of density 6.5 ± 10 percent g/cm^3. The current is passed through the piece and resistance is measured in the direction perpendicular to the direction of moulding and the resistivity is calculated in micro-ohm-cm.

8.4 Particle Size Distribution

Test method as given in IS 5461 shall be followed.

8.5 Microscopic Examination

8.5.1 Observation of materials through a microscope is recommended in order that the characteristic details may be recognized, for example, shape, unusual or diverse particle, colour, etc. Findings of each visual observation should be recorded for future reference, since conclusion from microscopic examination can be drawn only after some experience.

8.5.2 *Instrument*

Laboratory/metallurgical microscope up to 100 magnification.

8.5.3 *Recommended Particle Shape*

70-80 percent of the particles should be round in shape (granular).

8.6 Chip Formation

8.6.1 *Method*

Approximately 1.0 g of tamping powder is kept on a flat steel surface and a punch with flat bottom surface fitted to a fly press is brought down on the powder with an impact so that the powder flattens out and forms a chip. If the quality of powder is satisfactory, it will form into a smooth flat chip.

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Amendments Issued Since Publication

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